National Institute of Environmental Health Sciences

Response of vegetation restoration to climate change and human activities in Shaanxi-Gansu-Ningxia Region

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Abstract:

The "Grain for Green Project" initiated by the governments since 1999 were the dominant contributors to the vegetation restoration in the agro-pastoral transitional zone of northern China. Climate change and human activities are responsible for the improvement and degradation to a certain degree. In order to monitor the vegetation variations and clarify the causes of rehabilitation in the Shaanxi-Gansu-Ningxia Region, this paper, based on the MODIS-NDVI and climate data during the period of 2000-2009, analyzes the main characteristics, spatial-temporal distribution and reasons of vegetation restoration, using methods of linear regression, the Hurst Exponent, standard deviation and other methods. Results are shown as follows. (1) From 2000 to 2009, the NDVI of the study area was improved progressively, with a linear tendency being 0.032/10a, faster than the growth of the Three-North Shelter Forest Program (0.007/10a) from 1982 to 2006. (2) The vegetation restoration is characterized by two fast-growing periods, with an "S-shaped" increasing curve. (3) The largest proportion of the contribution to vegetation restoration was observed in the slightly improved area, followed by the moderate and the significantly improved area; the degraded area is distributed sporadically over southern part of Ningxia Hui Autonomous Region as well as eastern Dingbian of Shaanxi province, Huanxian and Zhengyuan of Gansu province. (4) Climate change and human activities are two driving forces in vegetation restoration; moreover anthropogenic factors such as "Grain for Green Project" were the main causes leading to an increasing trend of NDVI on local scale. However, its influencing mechanism remains to be further investigated. (5) The Hurst Exponent of NDVI time series shows that the vegetation restoration was sustainable. It is expected that improvement in vegetation cover will expand to the most parts of the region.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2, SRES B2

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Security

Food/Water Security: Agricultural Productivity

Geographic Feature:

resource focuses on specific type of geography

Desert

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: China

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Intervention:

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Medium-Term (10-50 years)